REMARKS

Claims 1 – 8 and 10 – 19 remain in this case. Applicants respectfully request examination of them in view of the remarks below.

For the Examiner's convenience, applicants repeat and amplify the remarks regarding claim 1 – 8, 10, and 11 presented in the Amendment previously filed as part of the Request for Continued Examination (RCE). It is probably easiest if the Examiner ignores the remarks in the RCE amendment.

With regard to the rejection of various claims under 35 U.S.C. § 102, the cited Yamada reference teaches two different and distinct embodiments for electrical power supply systems for a hybrid vehicle. FIG. 5 shows the prior art. FIGS. 1 and 4 show the invention in Yamada that presumably corrects deficiencies in the prior art.

The prior art system in FIG. 5 includes an electric motor 6 for mechanically powering the vehicle and a transmission device 7, 8 for transmitting torque from the motor to the drive wheels. A main bus (unnumbered) connects the main battery in FIG. 5 to a rectifier 3 that rectifies the output of the generator 3 and an inverter that provides the electrical power that motor 6 needs. The rectifier provides DC power to both the motor 6 and the main battery 4. A DC-DC converter 11 provides appropriate DC power to charge an auxiliary power supply 10, apparently a battery, stated to provide power for accessories.

FIG. 5 shows no connection from auxiliary battery 10 to accessories 13 other than through converter 11, the main bus, and power supply 10. It is difficult to conclude that power supply 10 can independently supply power to accessories 13, since it appears that power supply 10 and main battery 4 share the main bus. It appears that the intent is for power supply 10 to supplement the main battery when providing power to motor 6. However, neither FIG. 5 nor the text specify controls for converter 11 that coordinate such supplementary power for motor 6.

Yamada, col. 2, lines 19 – 50 describe one deficiency of the FIG. 5 prior art system. The prior art system uses electric power storage devices 4 and 10 that apparently do not handle regenerative charging well. Regenerative charging current is large but of relatively short duration,

for which the chemical reaction design typical for batteries 4 and 10 is inefficient.

The FIG. 5 (prior art) system does not show any sort of threshold detector to control operation of converter 11.

The system of FIGS. 1 – 4 is Yamada's other embodiment. This embodiment uses a main battery 41 to constantly power the electric motor, see FIG. 1. A generator provides power both for charging battery 41 and for the motor. A high capacity, fast charge and discharge capacitor 42 during acceleration supplements the power that main battery 41 provides to the electric motor. The characteristics of capacitor 42 allow its rapid charge when receiving the high current, short duration power from regenerative braking. Apparently, the generator can also charge capacitor 42 during normal operation when the vehicle is neither accelerating nor decelerating at high levels, although Yamada may not be totally clear on this. This makes sense though, since it's unlikely that regenerative charging alone will suffice to charge capacitor 42 to a level to sustain most of the power required for acceleration.

However, Yamada's capacitor 42 clearly does not serve to power the electrical accessories of the vehicle. In fact, FIGS. 1 and 4 show no accessories whatsoever. Moreover, the main battery 41 is not connected via any sort of device that may switch the current for powering the motor from the main battery, see in FIG. 1, the hard wired connections of battery 41 to the main bus between rectifier 3 and inverter 5.

The electric motor is apparently powered by the main battery 41 when the current of the main battery 41 is under a specified value, or by the main battery **and** the capacitor 42 when the current of the main batter 41 reaches a value greater than the specified value (as during acceleration). Since neither FIG. 1 nor FIG. 5 show a switch for disconnecting main battery 41 from the motor, it's most likely that the main battery 41 constantly powers the motor.

Claim 1 as amended defines an electric vehicle control system using two separate energy level thresholds to select the battery source for providing motive power. These limitations are found in the description on p. 5. Both energy thresholds are based on the power that the first battery delivers. Either both batteries 5, 6, or main battery 5 only provide power to the motor as a function of

the first threshold. As a function of the second threshold, only the second battery provides motor power. This allows the second battery of claim 1, which provides power for accessories, to also function as the sole source for motor power when power requirements are low, for example, when the vehicle is idling or moving slowly in traffic. As a function of the first threshold, the second battery augments the main battery during periods of rapid acceleration.

Yamada in the FIGS. 1 – 4 embodiment, shows only the one energy threshold that current detector 410 provides. (Yamada's current detector 437 output is apparently an input to the current regulator 440 within chopper 43, for use only to control the input and output current level for capacitor 42, although Yamada's description mentions current detector 437 only once at col. 5, line 28.) The one Yamada energy threshold thus shifts current usage from the first battery to both batteries, to limit current flow from battery 41. Neither Yamada system allows the auxiliary battery only to provide motor power.

The claim 1 structure allows the second battery to be of a less costly and more durable design than the first battery. The first battery can therefore be of smaller capacity, and therefore cheaper.

Yamada uses only a single energy threshold, for the sole purpose of connecting both of the batteries to the motor when energy levels are high, as during acceleration. The Yamada FIGS. 1 – 4 system does not even pretend to address the issue of providing accessory power. Applicants believe the capacitor 42 that Yamada shows is unsuitable for providing accessory power, and hence does not disclose a system where an auxiliary battery provides constant accessory power and supplementary power during acceleration,. Applicant believes that claim 1 is allowable for these reasons.

Claims 2 – 5 depend from claim 1 and are allowable for that reason.

Claim 6 defines a method for operating an electric vehicle having two batteries in a way that uses only a selected one of the batteries when the motor operates with low power. Yamada does not teach this feature, as mentioned above, so claim 6 is also allowable.

Claim 7 defines a method similar to that of claim 6, but that bases switching to second battery power on both the energy requirements of the motor and the energy delivered by the first battery. Yamada does not teach this feature, so claim 6 is also allowable.

Claims 8 and 10 depend from claims 6 and 7 respectively and are allowable for that reason. They are similar and teach regenerative braking in the context of the claim 1 and 6 limitations. Yamada discusses regenerative braking, but not in connection with managing in a way depending on suitable charging rates for the batteries, battery charging of two batteries resulting from regenerative braking. Application, p. 6, line 11ff provides support for the limitations in these claims. Accordingly, applicant believes a further basis for allowing claims 8 and 10 exists.

Claim 11 depends from claim 1 and is allowable for that reason. In addition, claim 11 teaches a three threshold power management system that determines when the first battery, second battery, and both batteries provide power to the motor. Support for this claim 11 is found in the application on p. 5, lines 11 – 30. Yamada does not show such battery management.

Claims 12 – 19 essentially re-enter the original claims 1 – 8 respectively. Upon reflection, applicants believe that these claims contained patentable subject matter, and respectfully request the Examiner to reconsider his original rejection of them.

Applicants assume the Examiner has in mind the discussion of the Yamada reference earlier in these remarks. Considering the rejection of claim 12 first, applicants would like to discuss the bases for this rejection that Examiner presented in the final rejection of April 3, 2009 for claim 1 on p. 2.

The Examiner rejected claim 12 (original 1) as anticipated by Yamada et al. Applicants respectfully traverse and request reconsideration.

As previously explained, Yamada shows two different designs for electric vehicles. Yamada's FIGS. 1 – 4 system has threshold detection whose value determines when power requirements are high and capacitor 42 output should supplement battery 41 output for driving the motor. But the FIGS. 1 – 4 system does not show accessories. Because the chopper 43 connects capacitor 42 to the main bus only when the current flow from main battery 41 is high as indicated by the current detector 410, presumably, only battery 41 powers the accessories.

As mentioned previously, a capacitor 42 is ill-suited for providing accessory power. FIGS. 1

and 4 do not even show an accessory element or a connection for accessories. The description makes only a brief allusion (col. 4, line 7ff) to similar reference numbers in FIGS. 1 and 5. Yamada does not in any way suggest where or how an accessory might be connected to receive power from capacitor 42.

Yamada's FIG. 5 shows accessories 13 connected through the "power supply for accessory" 12 to the main power bus connecting rectifier 3 and inverter 5. The descriptive text for FIG. 5 makes but a single mention of the accessories 13 in col. 1, line 27. In FIG. 5, both batteries 4 and 10 connect directly to the main power bus only. Therefore, both batteries in FIG. 5 constantly provide power to the accessories. Thus, the accessories may drain the main battery 4, affecting the ability of the main battery to provide power to motor 6.

It is clear that neither of Yamada's systems show a system with two batteries, where one battery only is dedicated to powering accessories, and in addition provides power that supplements the main battery. In claim 12, the second battery is specified to power the accessories.

Although the Examiner has not imposed an obviousness rejection on claim 12 using Yamada, applicants briefly discuss this issue in the hopes of speeding allowance of the claims. Neither of Yamada's systems show a single battery dedicated to powering accessories only. Both of these systems show an auxiliary battery (or capacitor) which when delivering power is always in parallel with the main battery and connected to the main bus. Yamada's FIG. 5 system shows an accessory connected to and receiving its power only from the main bus, and not from the auxiliary battery 10. Therefore, claim 12 is not obvious over Yamada.

By any analysis, claim 12 is allowable.

Claims 13 – 17 depend from claim 12 and are also allowable for that reason.

Claim 18 is a claim defining a method for powering the motor with the first battery only when the first battery is delivering power greater than a discharge energy threshold, and with the second battery only when the energy requirements of the motor is less than the discharge threshold. Yamada has no such switching feature to use the first battery only for higher power requirements, and the second battery only for lower power requirements. The description, p. 6, when read in a

totality, provides support for these limitations.

Claim 19 deals with regenerative charging. Claim 19 depends from claims 16 and 12, and is allowable for the reasons that claim 12 is allowable. In addition, claim 19 combines the steps of detecting deceleration and conducting regenerative charging current to the first (main) battery from the motor, as the motor functions as a generator. Applicants understand Yamada to disclose in the FIG. 1 – 4 system, the conduction of regenerative braking current to both the rapidly rechargeable capacitor as well as the main battery. Claim 19 does the opposite, directing the recharging current to the main battery only.

The first battery of claim 19 does not power accessories. This arrangement reduces the potential for recharge current surges in claim 19 that might damage the second battery.

In view of the forgoing, applicants believe that the claims in this case are now in condition for allowance, and applicants respectfully request the Examiner to so find.

Please charge any deficiencies or credit any overpayment to Deposit Account No. 14-0620.

Respectfully submitted,

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By their attorney

Date August 3, 2009

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